A.D. 1867, *28th June*. N° 1886.

Manufacturing Sulphuret of Carbon.

LETTERS PATENT to Charles Otto Heyl, of Berlin, in the Kingdom of Prussia, Manufacturer, for the Invention of "AN IMPROVED METHOD OF AND APPARATUS FOR MAKING SULPHURET OF CARBON."

Sealed the 24th December 1867, and dated the 28th June 1867.

PROVISIONAL SPECIFICATION left by the said Charles Otto Heyl at the Office of the Commissioners of Patents, with his Petition, on the 28th June 1867.

I, CHARLES OTTO HEYL, of Berlin, in the Kingdom of Prussia, Manufacturer, do hereby declare the nature of the said Invention for "AN IMPROVED METHOD OF AND APPARATUS FOR MAKING SULPHURET OF CARBON," to be as follows:—

Instead of putting the sulphur into the vertical cylinders as hitherto I place these cylinders in connection with iron tanks or vessels in which I volatilize the sulphur, and from whence I pass the volatilized sulphur to the vertical cylinders, the refuse and ashes remaining in the tanks.

Heyl's Improved Method of Manufacturing Sulphuret of Carbon.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Charles Otto Heyl in the Great Seal Patent Office on the 24th December 1867.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, CHARLES OTTO HEYL, of Berlin, in the Kingdom of Prussia, Manufacturer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-eighth day of June, in the year of our Lord One thousand eight hundred and sixty-seven, in the thirty-first year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Charles Otto Heyl, Her special licence that I, the said Charles Otto Heyl, my executors, administrators, and assigns, or such others as I, the said Charles Otto Heyl, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "AN IMPROVED METHOD OF AND APPARATUS FOR MAKING SULPHURET OF CARBON," upon the condition (amongst others) that I, the said Charles Otto Heyl, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Charles Otto Heyl, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the Sheet of Drawing hereunto annexed, and forming part of this my Specification, and to the figures and letters of reference placed thereon, Figure 1 being a front elevation of a building suitably constructed for the purposes of my Invention; Figure 2 a side elevation of same; Figure 3, ground plan; Figure 4, a transverse section; Figure 5 shewing a cylinder with tank and cleansing tubes through which the refuse left by the sulphuret and the carbon is removed; and Figure 6 one of the receivers detached.

The two lower windows of the building (see Fig. 1) give light to the fireplace, the three on the first floor to a chamber for the workmen, and the

three upper and smaller windows give light and air to the upper part of the actual furnace room. This arrangement is still better shewn at Fig. 2, the fire-place being to the left on the ground floor, (slightly sunken, as shewn in plan, Fig. 3,) and the chamber for the workmen above. The furnace is placed beneath the loftiest part of the building in order to give plenty of room for the ascent of the heat from the furnace, so that it may not become insupportable. The open shed partially encircling the furnace and leaning against the chimney covers the refrigerating vessels or receivers made of wrought iron and the connecting pipes which are of zinc. The chimney is 45 feet high, and 12 inches diameter (square or round.) The ground plan, Fig. 3, and the transverse section, Fig. 4, show a square pit covered with wood, and intended to contain the fuel. The fire-place is opened and closed by means of a hanging shutter composed of an iron frame of from 24 to 30 inches square, and filled with clay and fire-bricks. The fire surrounds the cast-iron cylinders, which are protected with fire-clay, and after rising to the top of the cylinders it passes downwards to a back shutter made like the one first mentioned, and thence through a flue to the chimney. The whole furnace is cased with strong wrought iron to prevent expansion, and is entirely constructed of fire-proof bricks, the cylinders and other cast-iron apparatuses exposed to the fire being made of a mixture of $\frac{2}{3}$ Scottish and $\frac{1}{3}$ Silesian iron, this mixture being admirably adapted both to withstand the fire and to resist the influence of the sulphuret burning within the cylinders. The tops of the cylinders (G, Fig. 5,) and their covers not being exposed to the fire may be of ordinary iron. At the bottom of the cylinders there is a large 8-inch cast-iron pipe B (Fig. 5,) closed by a screw tightened cover, and through this pipe the mineral parts of the carbon which do not combine with the volatilized sulphuret are withdrawn from the cylinder. The upright tube C conducts the sulphuret vapours from the tanks D to the cylinders A; these tanks or vessels D are of the best quality of Swedish cast iron, they being the most exposed to the fire, and are divided by a cast-iron partition into two compartments, into one of which the sulphur is introduced through the upper upright tube F, and there leaves every part of the mineral which it contains unvolatilized by the fire, the vapours surmounting the partition (between which and the top of the tank is left a space of two inches), and passing by the tube C to the cylinder A. The unvolatilized parts of the sulphur are withdrawn through the tube E, also closed by a screw tightened iron cap. The joints of the tubes and the cylinders are all luted with iron cement. The condensing apparatus consists of 5 receivers, the first of which stands in a wooden chest lined with lead, and containing two inches of water, the four succeeding wrought-iron receivers standing in

four cast-iron tanks filled to the sixth part with water. The receivers are without bottoms (see Fig. 6), and each of them has at its top two holes, with collars of from 3 to 4 inches high, and is further encircled at the top by a rim also 3 to 4 inches in height in order that when the zinc tubes have been passed through the holes (resting by their flanges on the collars as shewn, Fig. 6,) the atmospheric air may be excluded by water (mixed in winter time with glycerine) on the top of the receivers and below in their tanks. The end of these zinc tubes furthest from the furnace is double cased, is longer than the opposite end, and enters the receiver to a depth of about 12 inches. From both of the last receivers a tube leads into a 6-inch open pipe or tube of cast iron let into the flue leading to the chimney. The rail above the furnace is only used for moving the cylinders and other parts. On the left of the fire-place is a pit to hold the supply of sulphur.

The process is as follows:—The furnace being gradually heated until the clay and iron assume a bright red colour (this being ascertained by inspection through openings made for this purpose) a pound of sulphur is put into each of the tubes F every 3 to 5 minutes either by the workmen or by mechanical means. This sulphur becomes volatilized in the tank or vessel D, and the vapour passing over the partition of the tank descends in the large tube C, from whence it passes to and rises in the cylinder A. The cylinders A are filled every 6 hours (or are continuously supplied by mechanical means) with dry carbon of wood or charcoal, which set on fire by the outer heat throws off vapours of carbon, which combining with the sulphur vapours arriving from the tanks D produce sulphuret of carbon; this sulphuret of carbon rising in the cylinders escapes through the long wrought-iron pipes H to the refrigerating receivers, from which the quantity produced is daily removed.

Having now described the nature of my said Invention, and the manner in which I carry the same into practical effect, I would have it distinctly understood that I do not confine myself precisely to the dimensions of parts herein given, as such may be varied to suit the circumstances of particular cases, and various modifications may also be made in the construction and arrangement of parts of my improved apparatus without departure from my Invention, and that I claim as novel and secured to me by the herein-before in part recited Letters Patent, the entire combination of apparatus herein set forth and illustrated on the annexed Sheet of Drawing, together with the process of manufacture herein set forth as forming "An Improved Method of and Apparatus for Making Sulphuret of Carbon," the three main features of which are,—

1. The use of iron vessels or tanks for volatilizing the sulphur, thus preventing the incombustible mineral parts of the sulphur from entering the cylinders

where they would impede the circulation of the volatilized sulphuret and cause the cylinders to burn.

2. The employment of the tubes for clearing out the tanks and cylinders.

3. The burning of the sulphuretted hydrogen gas, the production of which cannot be avoided (by reason of the humidity of the carbon and of the sulphur) by leading it to the part of the flue of the chimney with as much atmospheric air as will prevent it from burning back through the receivers (thus avoiding all danger of damage by explosion).

In witness whereof, I, the said Charles Otto Heyl, have hereunto set my hand and seal, this Sixteenth day of December, in the year of our Lord One thousand eight hundred and sixty-seven.

C. O. HEYL. (L.S.)

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Printers to the Queen's most Excellent Majesty. 1867.

FIG. 1.

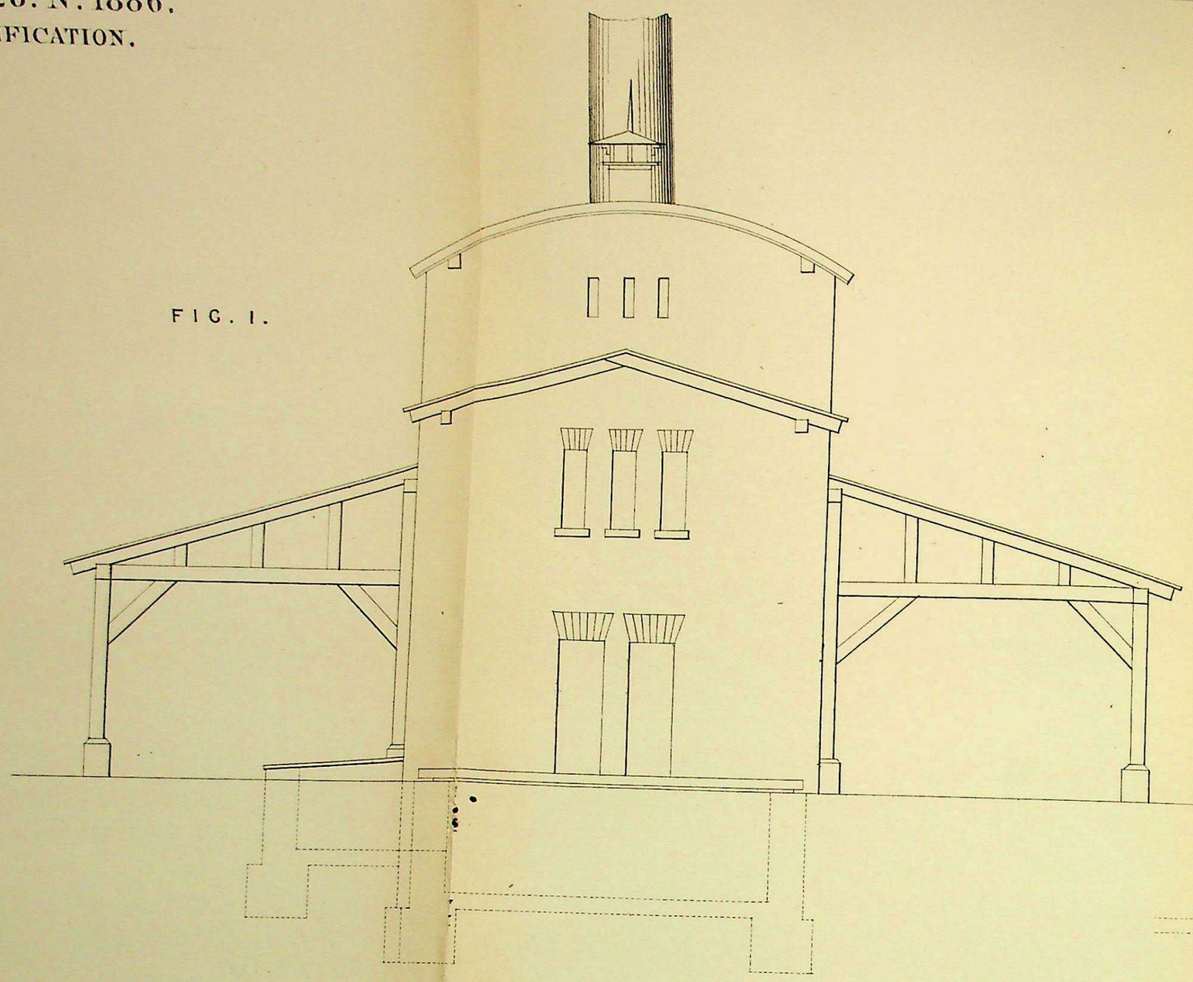


FIG. 2.

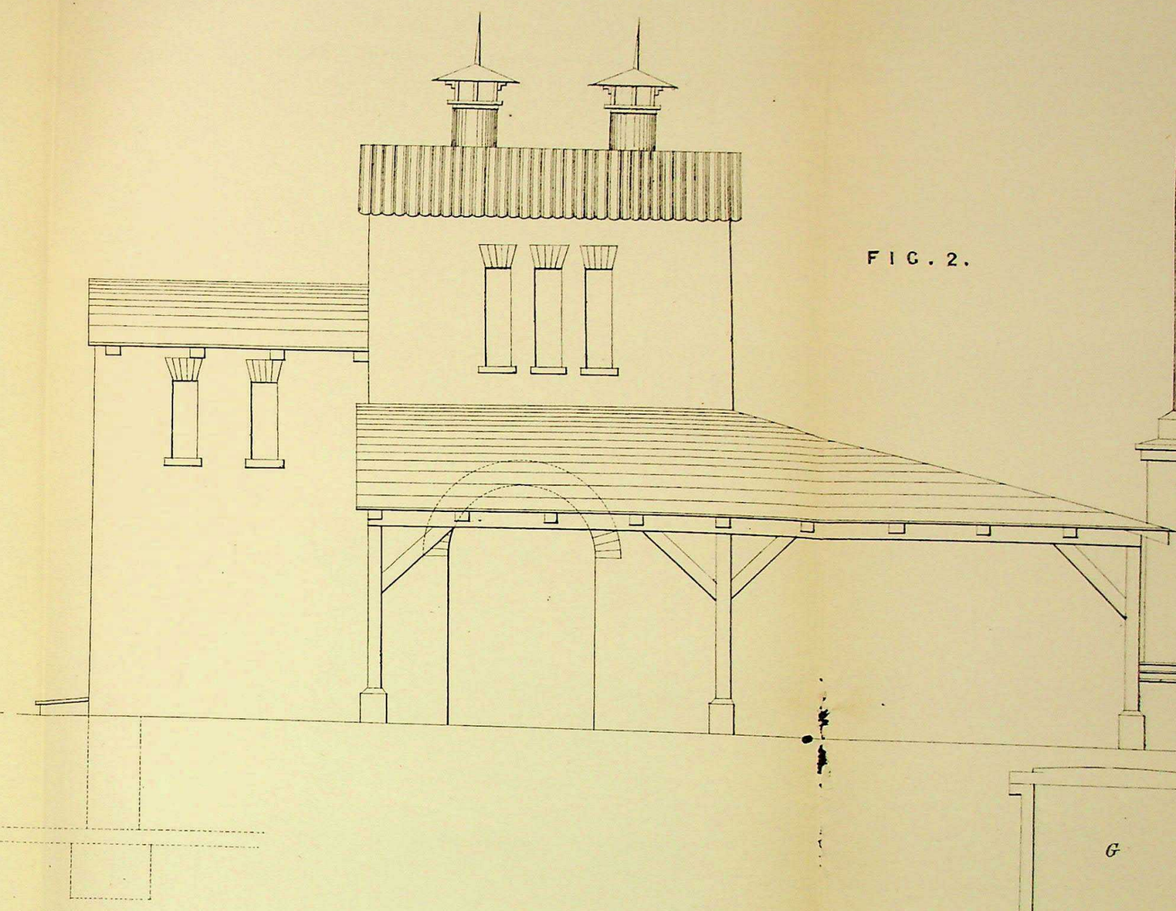


FIG. 3.

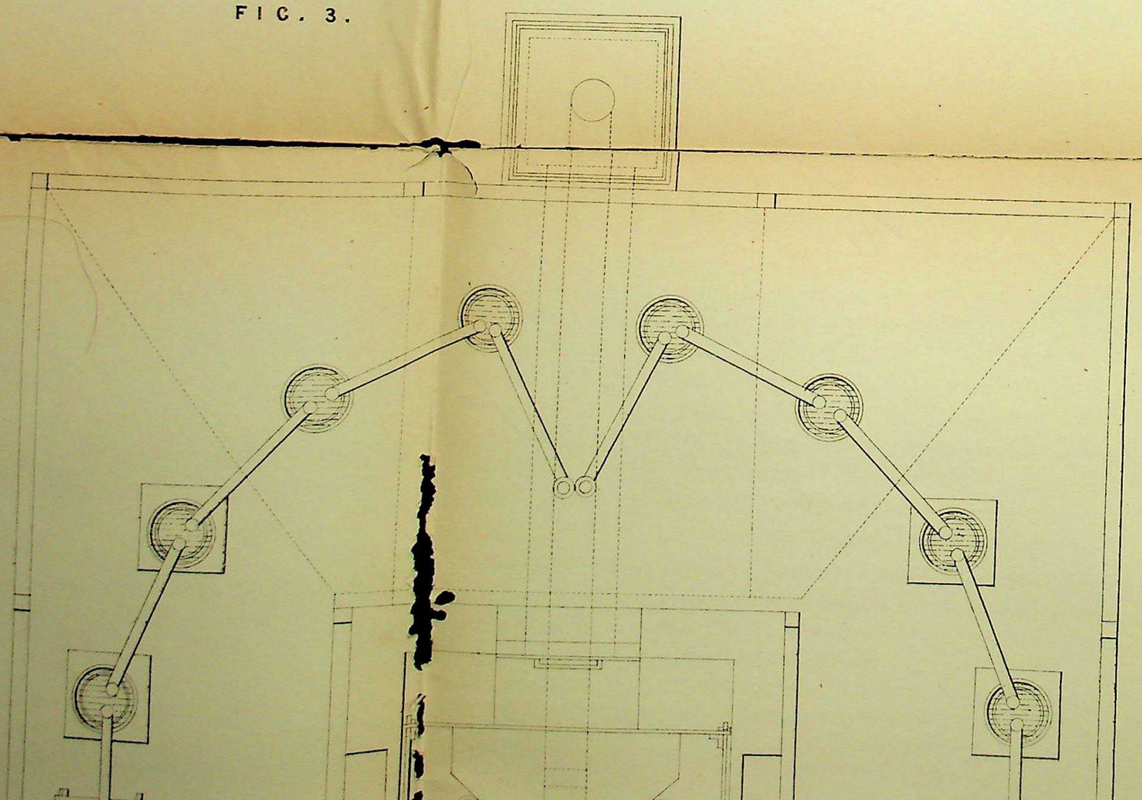


FIG. 4.

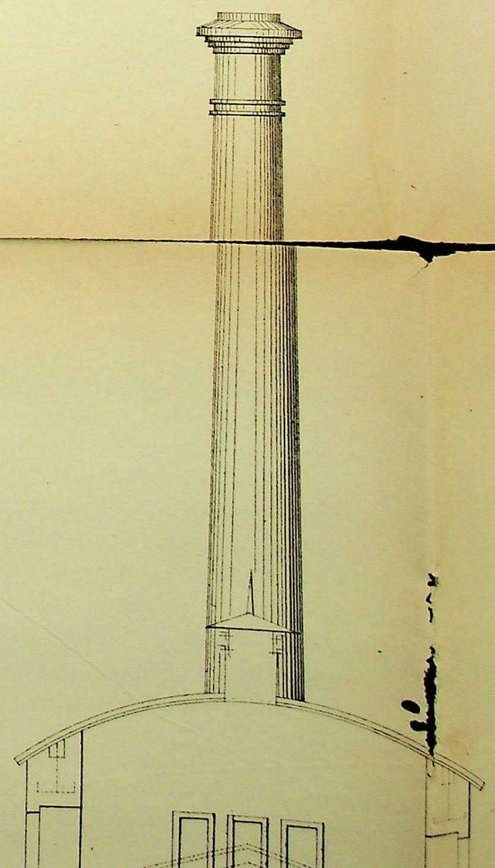
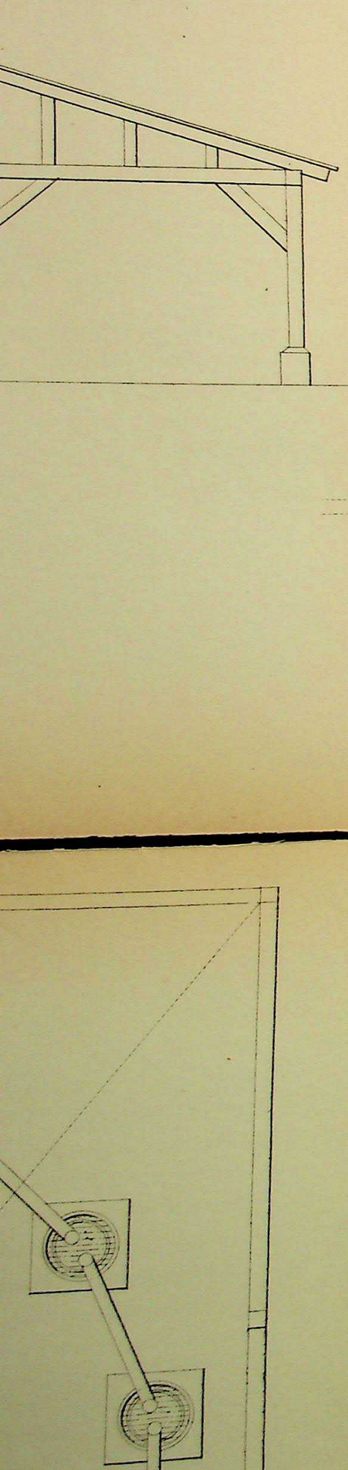
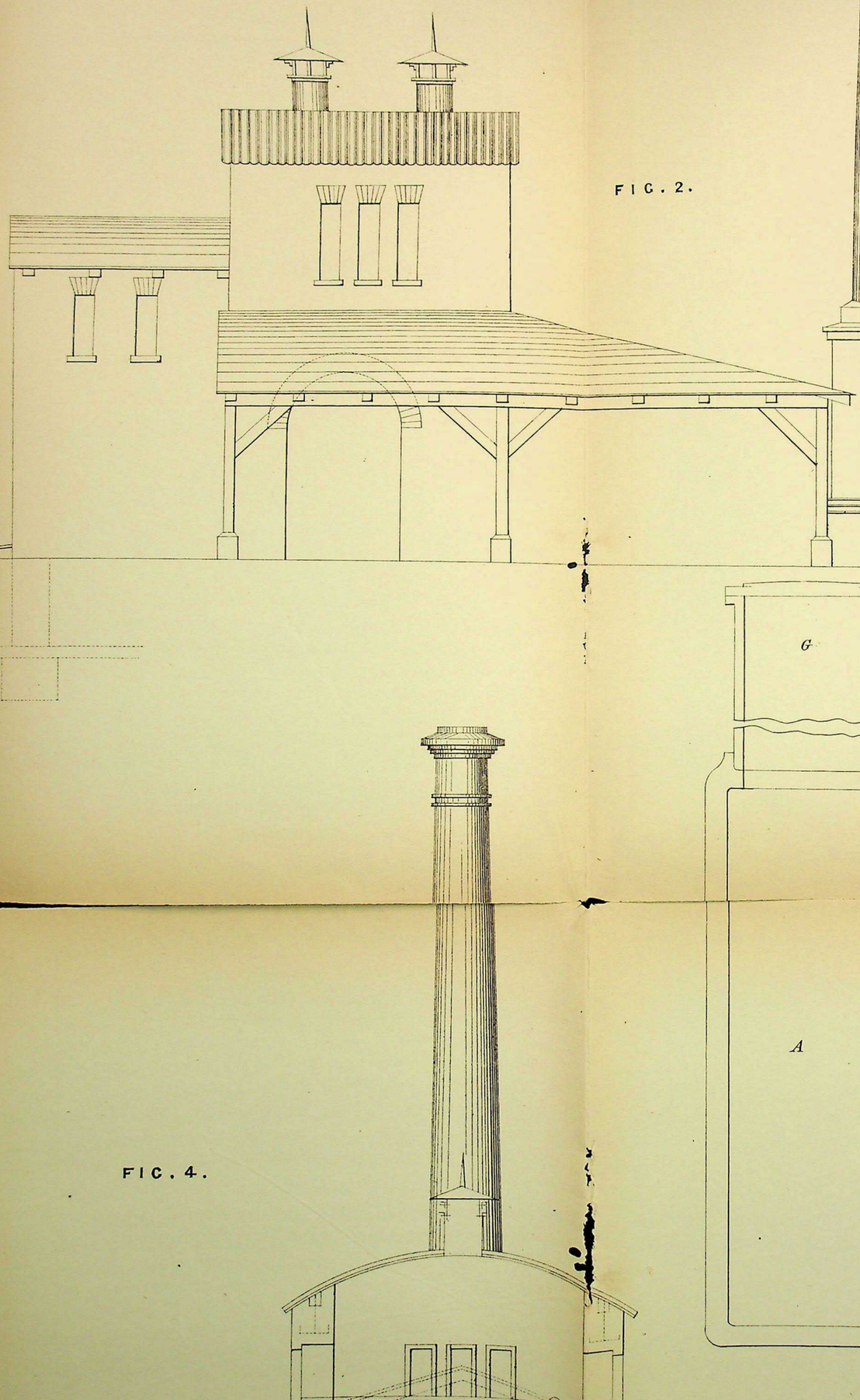


FIG. 2.





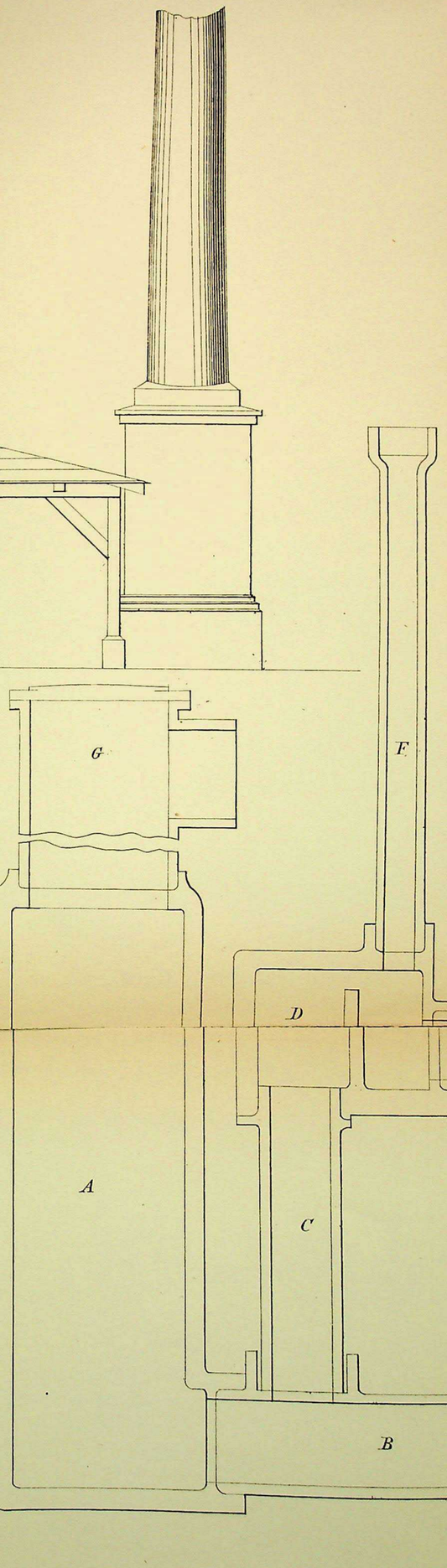


FIG. 5.

FIG. 4.

FIG. 3.

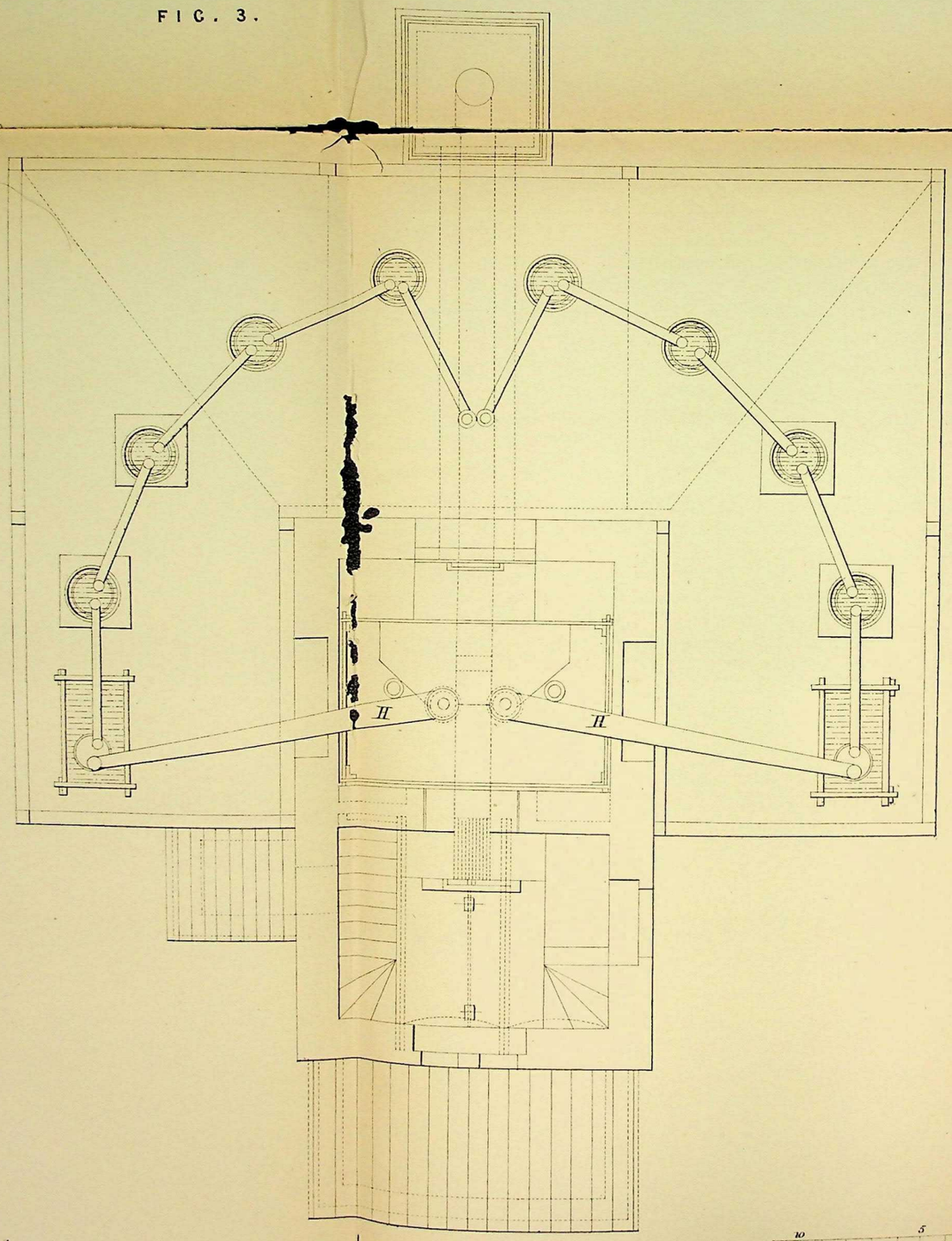
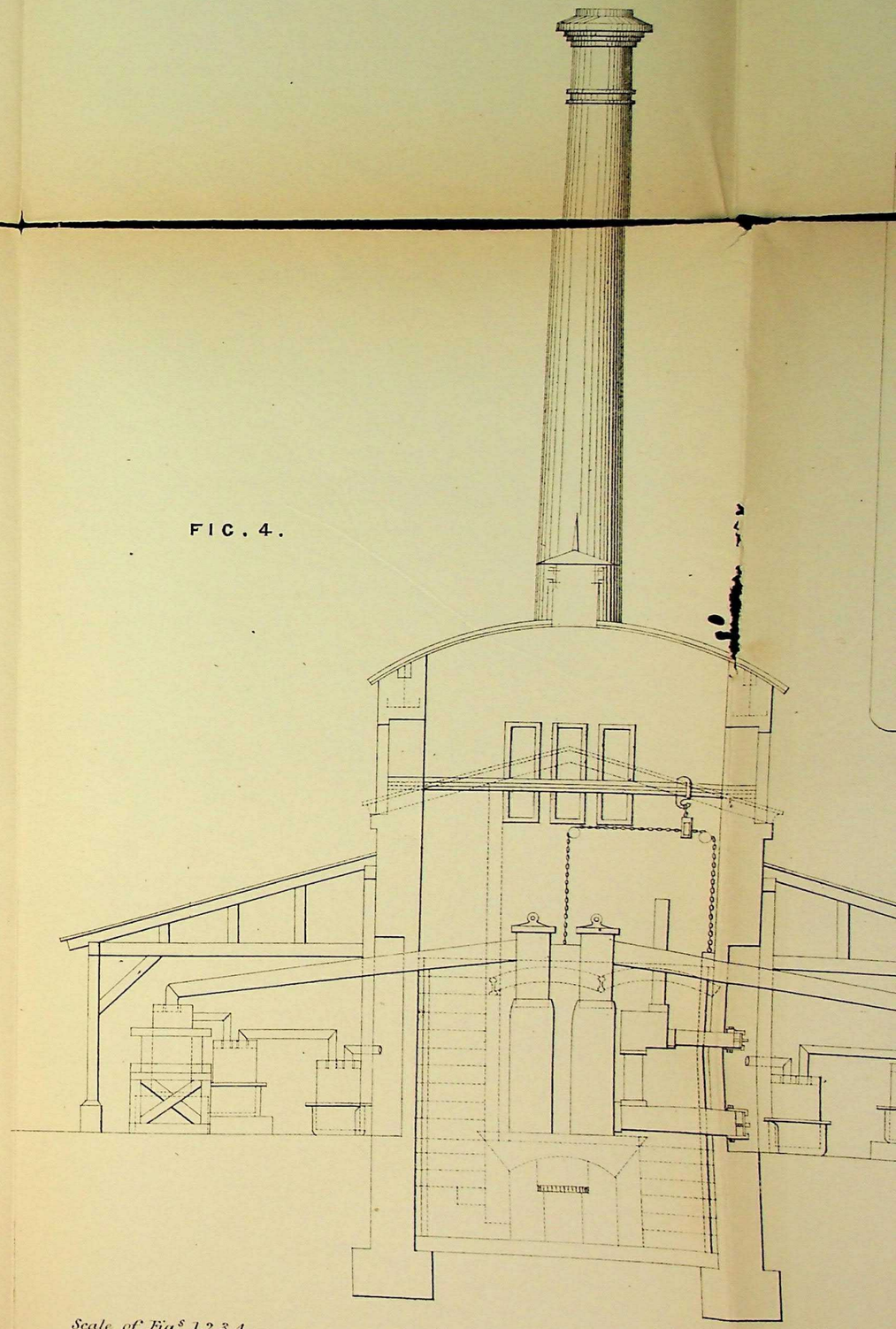


FIG. 4.



Scale of Figs. 1.2.3.4.

10 5 0 10 20 30

The filed drawing is partly colored.

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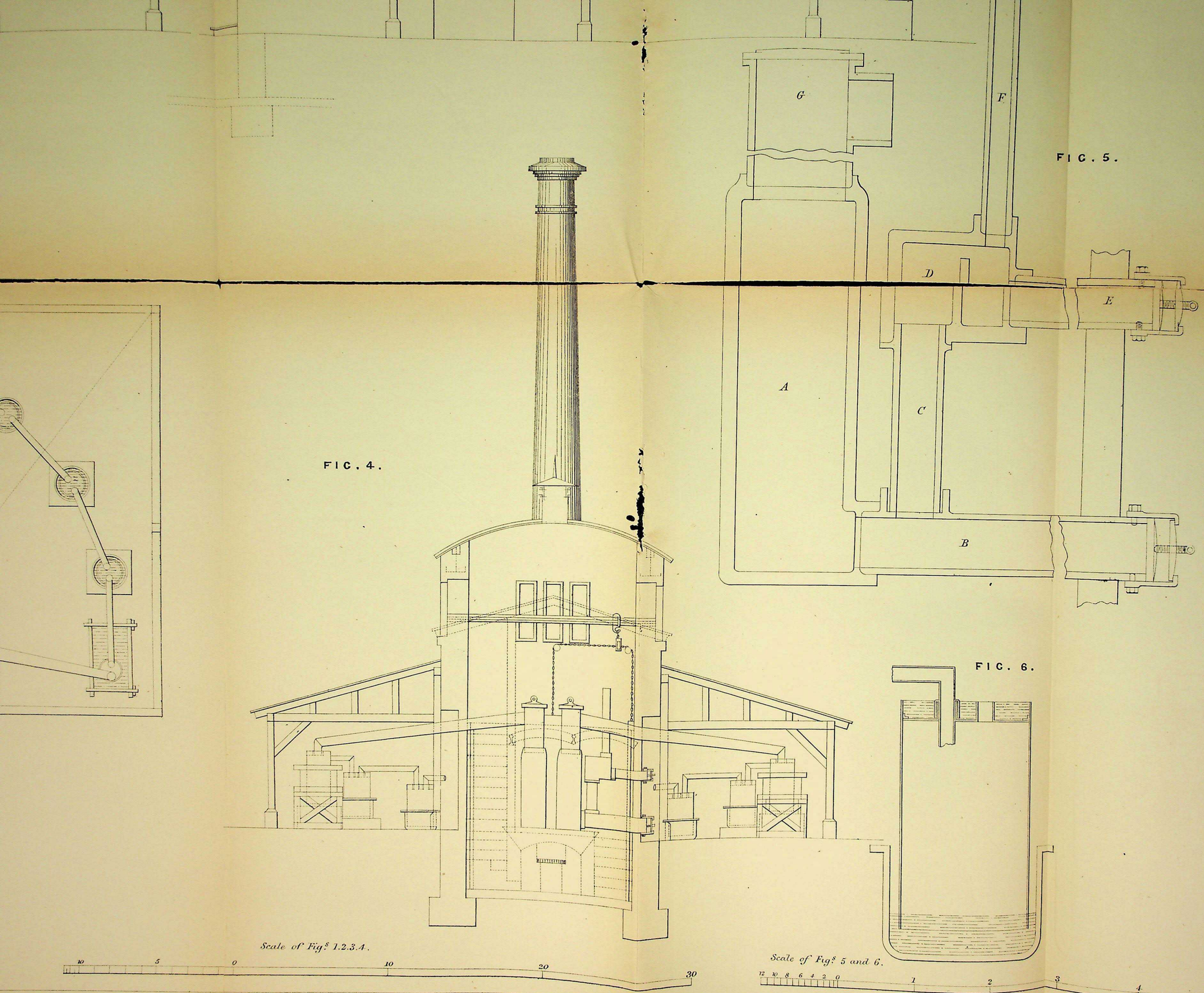

FIG. 5.

FIG. 4.

FIG. 6.

Scale of Figs. 1.2.3.4.

10 5 0 10 20 30

Scale of Figs 5 and 6.

12 10 8 6 4 2 0 1 2 3 4 5

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